$x_{refspan}$ = reference concentration of the span gas.

$x_{prespan}$ = pre-test interval gas analyzer response to the span gas concentration.

$x_{postspan}$ = post-test interval gas analyzer response to the span gas concentration.

x_i or $\bar{x}$ = concentration recorded during test, before drift correction.

$x_{prezero}$ = pre-test interval gas analyzer response to the zero gas concentration.

$x_{postzero}$ = post-test interval gas analyzer response to the zero gas concentration.

Example:

$x_{refzero}$ = 0 µmol/mol
$x_{refspan}$ = 1800.0 µmol/mol
$x_{prespan}$ = 1800.5 µmol/mol
$x_{postspan}$ = 1695.8 µmol/mol
x_i or $\bar{x}$ = 435.5 µmol/mol
$x_{prezero}$ = 0.6 µmol/mol
$x_{postzero}$ = −5.2 µmol/mol

$$x_{idriftcorrected} = 0 + (1800.0 - 0) \cdot \frac{2 \cdot 435.5 - (0.6 + (-5.2))}{(1800.5 + 1695.8) - (0.6 + (-5.2))}$$

$x_{idriftcorrected}$ = 450.2 µmol/mol

(3) For any pre-test interval concentrations, use concentrations determined most recently before the test interval. For some test intervals, the most recent pre-zero or pre-span might have occurred before one or more previous test intervals.

(4) For any post-test interval concentrations, use concentrations determined most recently after the test interval. For some test intervals, the most recent post-zero or post-span might have occurred after one or more subsequent test intervals.

(5) If you do not record any pre-test interval analyzer response to the span gas concentration, $x_{prespan}$, set $x_{prespan}$ equal to the reference concentration of the span gas:

$x_{prespan} = x_{refspan}$.

(6) If you do not record any pre-test interval analyzer response to the zero gas concentration, $x_{prezero}$, set $x_{prezero}$ equal to the reference concentration of the zero gas:

$x_{prezero} = x_{refzero}$.

(7) Usually the reference concentration of the zero gas, $x_{refzero,}$ is zero: $x_{refzero}$ = 0 µmol/mol. However, in some cases you might know that $x_{refzero}$ has a non-zero concentration. For example, if you zero a CO_2 analyzer using ambient air, you may use the default ambient air concentration of CO_2, which is 375 µmol/mol. In this case, $x_{refzero}$ = 375 µmol/mol. Note that when you zero an analyzer using a non-zero $x_{refzero,}$ you must set the analyzer to output the actual $x_{refzero}$ concentration. For example, if $x_{refzero}$ = 375 µmol/mol, set the analyzer to output a value of 375 µmol/mol when the zero gas is flowing to the analyzer.

§ 1065.675 CLD quench verification calculations.

Perform CLD quench-check calculations as follows:

(a) Perform a CLD analyzer quench verification test as described in § 1065.370.

(b) Estimate the maximum expected mole fraction of water during emission testing, x_{H2Oexp}. Make this estimate where the humidified NO span gas was introduced in § 1065.370(e)(6). When estimating the maximum expected mole fraction of water, consider the maximum expected water content in combustion air, fuel combustion products, and dilution air (if applicable). If you introduced the humidified NO span gas into the sample system upstream of a sample dryer during the verification test, you need not estimate the maximum expected mole fraction of water and you must set x_{H2Oexp} equal to $x_{H2Omeas}$.

(c) Estimate the maximum expected CO_2 concentration during emission testing, x_{CO2exp}. Make this estimate at the sample system location where the blended NO and CO_2 span gases are introduced according to § 1065.370(d)(10). When estimating the maximum expected CO_2 concentration, consider the maximum expected CO_2 content in fuel combustion products and dilution air.

(d) Calculate quench as follows:

$$quench = \left(\left(\frac{\frac{x_{\text{NOwet}}}{1-x_{\text{H2Omeas}}}}{x_{\text{NOdry}}} - 1 \right) \cdot \frac{x_{\text{H2O exp}}}{x_{\text{H2Omeas}}} + \left(\frac{x_{\text{NOmeas}}}{x_{\text{NOact}}} - 1 \right) \cdot \frac{x_{\text{CO2 exp}}}{x_{\text{CO2act}}} \right) \cdot 100\% \qquad \text{Eq. 1065.675-1}$$

Where:

$quench$ = amount of CLD quench.

x_{NOdry} = concentration of NO upstream of a bubbler, according to §1065.370(e)(4).

x_{NOwet} = measured concentration of NO downstream of a bubbler, according to §1065.370(e)(9).

x_{H2Oexp} = maximum expected mole fraction of water during emission testing, according to paragraph (b) of this section.

x_{H2Omeas} = measured mole fraction of water during the quench verification, according to §1065.370(e)(7).

x_{NOmeas} = measured concentration of NO when NO span gas is blended with CO_2 span gas, according to §1065.370(d)(10).

x_{NOact} = actual concentration of NO when NO span gas is blended with CO_2 span gas, according to §1065.370(d)(11) and calculated according to Equation 1065.675–2.

x_{CO2exp} = maximum expected concentration of CO_2 during emission testing, according to paragraph (c) of this section.

x_{CO2act} = actual concentration of CO_2 when NO span gas is blended with CO_2 span gas, according to §1065.370(d)(9).

$$x_{\text{NOact}} = \left(1 - \frac{x_{\text{CO2act}}}{x_{\text{CO2span}}} \right) \cdot x_{\text{NOspan}} \qquad \text{Eq.1065.675} - 2$$

Where:

x_{NOspan} = the NO span gas concentration input to the gas divider, according to §1065.370(d)(5).

x_{CO2span} = the CO_2 span gas concentration input to the gas divider, according to §1065.370(d)(4).

Example:

x_{NOdry} = 1800.0 µmol/mol
x_{NOwet} = 1729.6 µmol/mol
x_{H2Oexp} = 0.030 mol/mol
x_{H2Omeas} = 0.030 mol/mol
x_{NOmeas} = 1495.2 µmol/mol
x_{NOspan} = 3001.6 µmol/mol
x_{CO2exp} = 3.2%
x_{CO2span} = 6.00%
x_{CO2act} = 2.98%

$$x_{\text{NOact}} = \left(1 - \frac{2.98}{6.00} \right) \cdot 3001.6 = 1510.8 \, \mu\text{mol}/\text{mol}$$

$$quench = \left(\left(\frac{\frac{1729.6}{1-0.030}}{1800.0} - 1 \right) \cdot \frac{0.030}{0.030} + \left(\frac{1495.2}{1510.8} - 1 \right) \cdot \frac{3.2}{2.98} \right) \cdot 100\%$$

$quench = (-0.00939 - 0.01109) \cdot 100\% = -2.0048\%$
$= -2\%$

[73 FR 59340, Oct. 8, 2008]

§1065.690 Buoyancy correction for PM sample media.

(a) *General.* Correct PM sample media for their buoyancy in air if you weigh them on a balance. The buoyancy correction depends on the sample media